Electricity Basics

What is electricity?
Who and What is New York Power Authority?
Think of 3 things that you could not live without that use electricity?
What is electricity?

Electricity is the flow of tiny particles called electrons moving through a circuit.
What is a circuit?

Series Circuit

Parallel Circuit
Ohm’s Law

Electricity is measured by the amount of pressure moving through a circuit and the amount of electrons in the circuit.

- The pressure is called **volts**. The voltage pushes electrons.
- **Current** is the amount of electrons are called amps.
- The opposition to the electrical flow is **resistance**.

<table>
<thead>
<tr>
<th>Power (Watts)</th>
<th>Current X Voltage</th>
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<tbody>
<tr>
<td>Voltage</td>
<td>Current X Resistance</td>
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</table>
New York Skyline lights are turned off.
Let’s build a circuit to turn them back on.
Safety

Do not put electrical components in your mouth

Always have a load in the circuit

Never run the path directly from the battery, back to the battery

If anything get hots, call over the teacher.
ACTIVITY 1
New York City Skyline

MATERIALS
Maker Tape
PATH

Battery
POWER SOURCE

LED light
LOAD
How to peel Maker Tape
WONDER TIME
What is the difference between a series and parallel circuit?
What does Ohm’s Law help us do?
Electricity Generation and Transmission

Where does it come from? How does it get to us?
NIAGARA HYDROPOWER PLANT in Lewiston

WIND TURBINES in South Fork
**RENEWABLE**

Fuels that can be easily made or replenished; we can never use up renewable fuels

- **BIOMASS**
  Anything that is alive or anything that was alive a short time ago is called biomass. Trees, crops, garbage, and animal waste are all biomass. We burn biomass to power generators.

- **GEOTHERMAL**
  Geothermal energy is heat from inside the Earth. The inside of the Earth is very hot. Sometimes this heat comes near the surface. We can use this heat to warm our houses and generate electricity with it.

- **HYDROPOWER**
  Hydropower is energy created by moving water. Moving water has a lot of energy. We use that energy to generate electricity by spinning turbines.

- **SOLAR**
  The sun provides lots of energy to the Earth. The energy from the sun can be converted by solar panels into electricity we can use.

- **WIND**
  Wind is moving air. We can use the power of the wind to turn the blades of wind turbine, which are connected to a generator that creates electricity.

**NON-RENEWABLE**

Fuels that cannot be easily made or replenished; We can use up nonrenewable fuels

- **COAL**
  Coal was formed millions of years ago from plants and animals that died at that time. Coal is a fossil fuel. Coal is often shiny black rock that we can burn to power generators.

- **NATURAL GAS**
  Natural gas is a mixture of gases you can’t see, smell or taste. Natural gas is a fossil fuel. We burn natural gas to make heat and power generators.

- **PETROLEUM**
  Petroleum is a fluid that is found underground. Sometimes we call it oil. Petroleum is a fossil fuel that has a lot of energy released when we burn it to power generators.

- **PROPANE**
  Propane is the gas we use to fuel our BBQ grill and is used to generate machines in warehouses. Propane is a fossil fuel. We burn it to power generators and motors.

- **URANIUM**
  Uranium is mineral found in rocks in the ground, the split uranium atoms to release a lot of energy in nuclear power plants.
Let’s model electricity generation and transmission through our state.
Safety

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BUILD ACTIVITY 2
Electricity Transmission

MATERIALS
WONDER TIME
How is electrical power created?

FORCE
Such as:
- moving water
- pressurised steam
- forceful wind

SPINS TURBINE

SPINS SHAFT

SPINS GENERATOR
magnet spinning past copper wire coils to generate electricity

ELECTRICAL OUTPUT
completes the current and travels through the network system to...

YOUR HOMES
Schools and local business in your community
How is electricity transmitted?
What careers do you think you could have with NYPA in the future?

What problems do you want to solve?